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Understanding the influence of pore-scale rock heterogeneity in CO₂ geo-sequestration

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Subsurface storage of CO₂ involves the injection of CO₂ into suitable geological formations and the monitoring of the injected plume over time. The science and technology of CO₂ geo-sequestration has been maturing over the last two decades. To increase the effectiveness of the underground CO₂ sequestration, the multi-phase-flow and its relevant mechanisms that change the distribution and concentration of the underground CO₂ must be assessed at multiple lengths scales. Predicting the behavior of CO₂-brine in the complex heterogeneous porous structure of reservoir rocks as well as the interaction between these fluids with minerals in rocks are important for designing and managing CO₂ storage sites.

In this work, we present lab-based experimental studies of CO₂-brine-rock systems at subsurface conditions. We use x-ray micro-CT to map the distribution of fluids in heterogeneous sandstone rocks. Our work combines experimental, 3D and 4D imaging and image analysis of simulated geo-sequestration of CO₂ conditions. We provide experimental and numerical analysis that shed light on the role of rock heterogeneity on the safety and capacity of CO₂ geo-sequestration at the pore scale.

Time Block Preference:

Time Block A (09:00-12:00 CET) **References:**

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Understanding the mechanisms of the brain's waterscape

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